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(71) Applicant: **Schneider, Bernardus Johannes Josephus Augustinus**
Zuideindseweg 54
NL-2645 BH Delfgauw(NL)

(72) Inventor: **Schneider, Bernardus Johannes Josephus Augustinus**
Zuideindseweg 54
NL-2645 BH Delfgauw(NL)

(74) Representative: **de Vries, Johannes Hendrik Fokke et al**
Octrooibureau Los en Stigter B.V. P.O. Box 20052
NL-1000 HB Amsterdam(NL)

(54) Container.

(57) According to the invention a container existing of container members is provided comprising indication means for indicating the extent of an overpressure or underpressure applied in the container. Preferably the container parts comprise the cover (2) and a container body (1), between which an annular, deformable indication member (3) is provided as indication means.

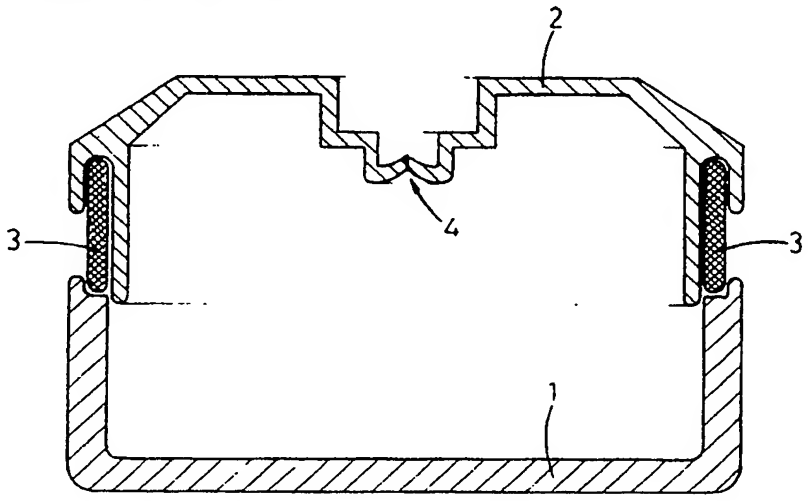

fig.1

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Container

The invention relates to a container comprising at least two container members and intended to be provided with an internal overpressure or underpressure.

Several containers of this type are known already. Herein for example foodstuffs may be stored. However these containers all have the disadvantage, that it is not or hardly possible to check whether the provided underpressure or overpressure in the interior of the container is still present.

It is an object of the invention to provide a container of the type mentioned before, in which this disadvantage is removed in a simple but nevertheless effective way.

Therefore, the container according to the invention is characterized in that at the cooperating sections of the two container members indication means are provided for indicating the pressure difference between the interior of the container and the surroundings. As a result at each desired moment one can check simply now whether the desired pressure difference between the interior of the container and the surroundings is still present.

According to a preferred embodiment of the container at least the cooperating sections of the two container members are movable relative to each other in dependency of the pressure difference, whereas between these members a means is provided that is deformable by this relative motion and of which the extent of deformation depends on the present pressure difference. With an increase of the pressure difference the deformation of the means will increase too and vice versa, so that an indication of the present pressure difference is provided.

Along with this it is avantageous if the indication means comprise the means acting as an indication member. The extent of deformation of this indication-member then offers a direct indication of the present pressure difference.

It is handy then if at least one of the cooperating sections of the container members is provided with a recess in which, in dependency of the pressure difference, the indication member can be accommodated to a greater or less extent. It is possible for example that at a certain pressure difference, the indication member is fully accommodated in the recess. If therefore the indication member is fully accommodated one knows that the applied pressure difference is still present. If however the indication member is only accommodated partially, this is an indication for the fact that the pressure difference has diminished or even totally vanished.

According to a preferred embodiment of the container according to the invention the one container member comprises at its circumference cooperating with the other container member a wall member with a U-shaped cross section, wherein the recess accommodating the indication member is defined by the space between the legs of the U-shaped wall member. In this way a simple construction is obtained that however offers a very effective function.

In this respect it is further possible, that the one leg of the U-shaped wall member is shorter than the other leg. Here the long leg can provide a reliable positioning of the indication member.

An improvement of the positioning of the indication member as well as of the guiding of the cover and the container body during a relative displacement is obtained, if the short leg is substantially aligned with the adjoining wall of the cooperating container member, whereas the long leg extends off-set with respect to this wall. During moving the container members closer the long leg moves at a short distance from that adjoining wall that functions as a guiding for this long leg.

Although it is possible that the indication member is an integral part of one of the container members according to another embodiment of the container according to the invention an indication member is provided that is accommodated releasably in the recess. Such an indication member can for example include a compressable ring.

For improving the deformability of such an indication member it is further possible, that the indication member is hollow, whereas it is preferred, that the indication member is made of thermoplastic rubber.

For increasing the serviceability of the container according to the invention it is possible, that the indication member comprises a scale division cooperating with a container member. By means of such a scale division the magnitude of the pressure difference between the interior of the container and the surroundings can be defined.

Alternatively it is possible, that the container members are provided with a cooperating scale division for indicating the pressure difference, said scale division forming the indication means. Now the relative position between the container members provides an indication of the present pressure difference.

If the indication member functions as a sealing member between the container members too the container according to the invention includes a minimal amount of parts and is therefore less complicated.

Hereafter the invention will be elucidated by

means of the drawing, in which a number of embodiments of the container according to the invention are illustrated.

Figure 1 shows a schematic sectional view of the first embodiment of the container according to the invention;

Figure 2 shows part of a container according to figure 1 on a larger scale and unloaded;

Figure 3 shows the part according to figure 2, however, loaded;

Figure 4 shows part of another embodiment of a container according to the invention in an unloaded situation;

Figure 5 shows the part according to figure 4 in a loaded situation;

Figure 6 shows part of a further embodiment of the container according to the invention in an unloaded situation; and

Figure 7 shows the part according to figure 6 in a loaded situation.

In figure 1 the container according to the invention is shown schematically and in section. This container comprises a container body 1, that is intended to receive products, such as foodstuffs or the like, and a cover 2 sealingly applicable thereto. Between the cover 2 and the container body 1 an indication member 3 is provided for indicating a pressure difference that can be applied between the interior of the container and the surroundings.

The container shown in figure 1 is intended to be provided with an internal overpressure or underpressure. To this end this container comprises in its cover a one way valve 4 through which air can be removed from the interior of the container.

The one way valve 4 preferably forms part of a plug as described in the European patent application 0.234.607. This plug can form an integral part of the cover 2, but it is possible too that this plug with one way valve is provided in the container body 1. Moreover, it is possible that the indication member described here is not provided between the cover and the container body but between the cover and the plug, or between the container body and the plug. The function of the container will not be influenced essentially by this.

The indication member 3 comprises a means that is deformable when loaded, whereby the extent of deformation represents a visual indication of a present pressure difference between the interior of the container and the surroundings. As appears clearly from the part shown on a larger scale in figure 2 of the container represented in figure 1 the cover 2 comprises the recess 5 in which the indication member 3 is at least partially accommodated. The cover 2 comprises at its circumference cooperating with the container body 1 a wall member having a U-shaped cross section, wherein the recess 5 accommodating the indication member 3 is defined by the space between the legs 6 and 7 of the U-shaped wall member. The indication member 3 now with its one side is locked up in the recess 5, whereas the other side of the indication member 3 engages the corresponding section of the container body 1. For this reason the container body 1, as shown, may be provided with a recess 8 for centring the indication member.

In the position of the cover 2 relative to the container body 1 shown in figure 2, in which there is no or hardly any underpressure in the container, the outer end of the outer leg 6 of the U-shaped wall member is positioned at some distance from the uppermost end of the container body 1. As a result a great part of the indication member 3 as well as a scale division 9 provided thereon is visible. If now a underpressure is applied in the container the cover 2 is moved towards the container body 1 such that a position according to figure 3 will be provided. In this position the distance between the end of the outer leg 6 and the uppermost end of the container body 1 has become smaller, so that only a small part of the scale division 9 is still visible. The indication member 3 that initially was accommodated with clearance in the recess 5 and the recess 8 now is compressed in the recess 5 and the recess 8, as is allowed by the material from which this indication member 3 is fabricated. In the position shown in figure 3 only a small part of the scale division 9 is visible, and this represents a clear visual indication of the underpressure present now in the container. Of course the shape of the container can be such, that the end of the leg 6 completely engages the uppermost end of the container body 1 such that, if a certain value of underpressure is present in the container, the indication member 3 is not visible at all. A container shaped in such a way is very easy in its use for only then sufficient underpressure is present if the indication member 3 is not visible.

As appears clearly from the figures 2 and 3 the outer leg 6 is shorter than the inner leg 7 of the U-shaped wall member. The outer leg 6 is substantially aligned with the adjoining wall of the cooperating container body 1. The inner leg 7 is inwardly off-set relative to this wall and as it were is guided by the innerside 10 of this wall.

In a variant not shown the outer leg 6 is longest and is transparent, so that the indication member remains visible for indicating the pressure difference.

In the embodiment according to figure 2 and 3 the indication member 3 is accommodated releasably in the recess. In this case this indication member comprises a compressable ring, that (in a way not shown) possibly can be hollow. The material of the indication member 3 for example may be thermoplastic rubber.

It will be clear, that in the shown embodiment of the indication member 3 it functions as a sealing member between the cover 2 and the container body 1 too.

The figures 4 and 5 show a second embodiment of the container according to the invention. Between the container body 11 and the cover 12 again an indication member 13 is provided being an integral part of the cover 12. In the position shown in figure 4 there is no or hardly any underpressure in the container. When applying an underpressure in the container the situation shown in figure 5 is obtained. In this situation the outer leg 14 of the cover 12 is positioned at a shorter distance from the container body 11 than in the situation shown in figure 4. Again it is possible to provide the indication member 13 with a scale division or to take provisions that in the desired underpressure situation the outer leg 14 completely engages the container body 11, so that the indication member 13 is not visible.

In contrast with the embodiments according to figure 1 until 5 the embodiment according to figure 6 relates to a container that is suited to be internally pressurised. In this case the interior of the container is meant to be at the right-hand side of the shown figure, whereas the surroundings are positioned at the left-hand side of the figure.

Again one can see a cover 15, a container body 16 and an indication member 17. In the position shown in figure 6 the interior of the container is not or hardly pressurised, whereas in the position shown in figure 7 there is a certain overpressure.

Previously we have mentioned containers that all comprise a container body and a cover with an indication member there between. Especially in the embodiments according to the figures 1 until 5 the cover can be easily released from the container body. In the embodiment according to figures 6 and 7 applying and releasing the cover 15 with respect to the container body 16 is more difficult however. In such a case it is possible that the cover can not be released from the container body but always remains connected therewith through the indication member 3. For putting products or the like in the container or removing them therefrom it is possible then that in the cover or in the container body a closable opening is provided. Moreover, it is indeed possible that between the cover and the container body (or any other container parts) a deformable member is provided, but that this does not form the real indication member. In such a case the indication member is formed by the cover and the container body themselves by means of a cooperating scale division, that provides an indication of their relative position and thus the present pressure difference between the interior of the container and the surroundings. It is possible for example that a part of the cover or container body is transparent and cooperates with a part of the container body or cover that is provided with a scale division, said latter part being positioned behind the transparent part. In such a case the deformable member only acts as a resilient member.

The invention is not restricted to the embodiments described before, that can be varied widely within the scope of the invention.

Claims

1. Container comprising at least two container members and intended to be provided with an internal overpressure or underpressure,**characterized** in that at the cooperating sections of the two container members (1, 11, 16; 2, 12, 15) indication means are provided for indicating the pressure difference between the interior of the container and the surroundings.

2. Container according to claim 1, **characterized** in that at least the cooperating sections of the two container members (1, 11, 16; 2, 12, 15) are movable relative to each other in dependency of the pressure difference, whereas between these members a means (9, 13, 17) is provided that is deformable by this relative motion and of which the extent of deformation depends on the present pressure difference.

3. Container according to claim 2, **characterized** in that the indication means comprise the means (9, 13, 17) acting as an indication member.

4. Container according to claim 3, **characterized** in that at least one of the cooperating sections of the container members (1, 11, 16; 2, 12, 15) is provided with a recess (5) in which, in dependency of the pressure difference, the indication member (3) can be accommodated to a greater or less extent.

5. Container according to claim 4, **characterized** in that, at a certain pressure difference, the indication member (3) is fully accommodated in the recess (5).

6. Container according to claim 4 or 5, **characterized** in that the one container member (1, 2) comprises at its circumference cooperating with the other container member (2, 1) a wall member with a U-shaped cross section, wherein the recess (5) accommodating the indication member (3) is defined by the space between the legs (6, 7) of the U-shaped wall member.

7. Container according to claim 6, **characterized** in that the one leg (6) of the U-shaped wall member is shorter than the other leg (7).

8. Container according to claim 7, **character-**

ized in that the short leg (6) is substantially aligned with the adjoining wall of the cooperating container member (1, 2), whereas the long leg (7) extends off-set with respect to this wall.

9. Container according to claim 8, **characterized** in that the short leg (6) is the outer leg.

10. Container according to claim 8, **characterized** in that the long leg (7) is the outer leg and is transparent.

11. Container according to one of the claims 3-10, **characterized** in that the indication member (3) is accommodated releasably in the recess (5).

12. Container according to claim 11, **characterized** in that the indication member (3) includes a compressible ring.

13. Container according to claim 11 or 12, **characterized** in that the indication member is hollow.

14. Container according to one of the claims 11-13, **characterized** in that the indication member is made of thermoplastic rubber.

15. Container according to one of the claims 3-10, **characterized** in that the indication member forms an integral part of one of the container members.

16. Container according to one of the claims 3-15, **characterized** in that the indication member (3) comprises a scale division (9) cooperating with a container member.

17. Container according to claim 1 or 2, **characterized** in that the container members are provided with a cooperating scale division for indicating the pressure difference, said scale division forming the indication means.

18. Container according to one of the claims 3-16, **characterized** in that the indication member (3) functions as a sealing member between the container members too.

19. Container according to one of the claims 1-18, **characterized** in that the container members comprise a cover (2) and a container body (1).

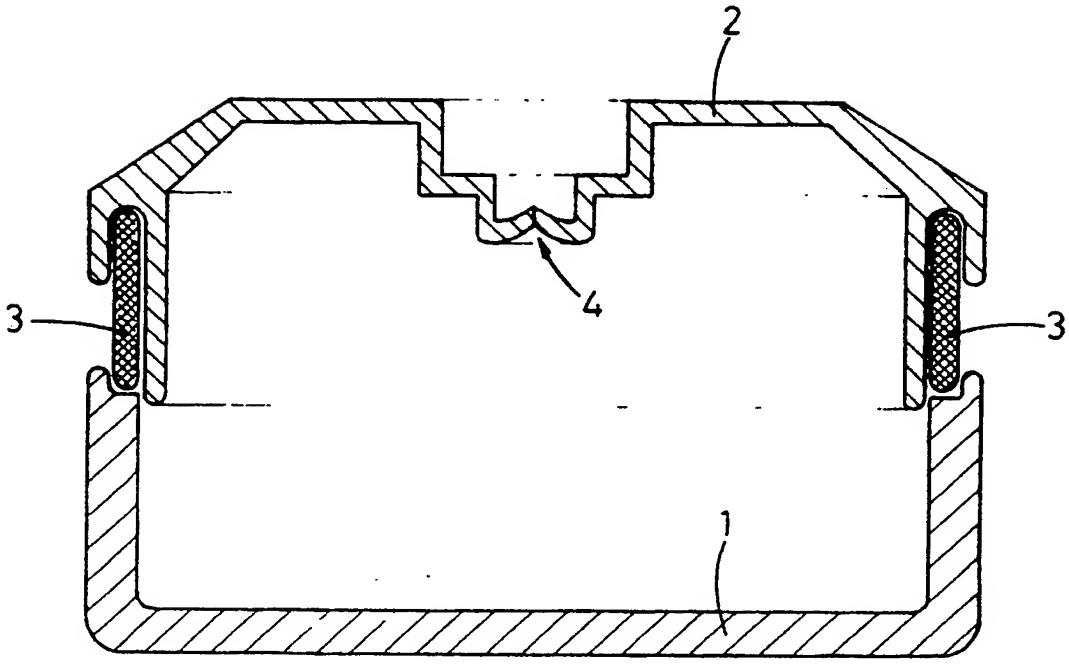

fig.1

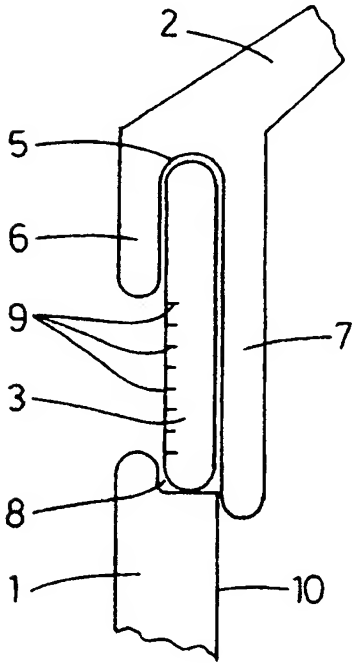

fig.2

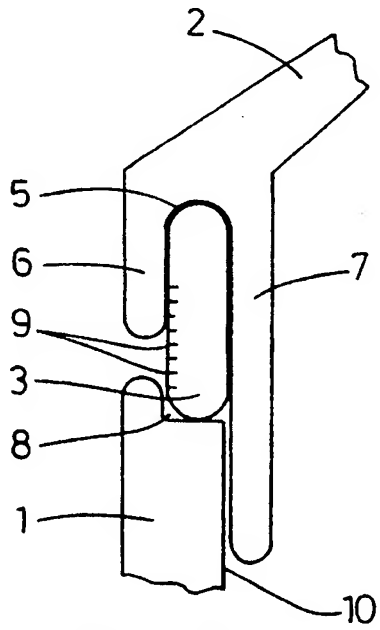

fig.3

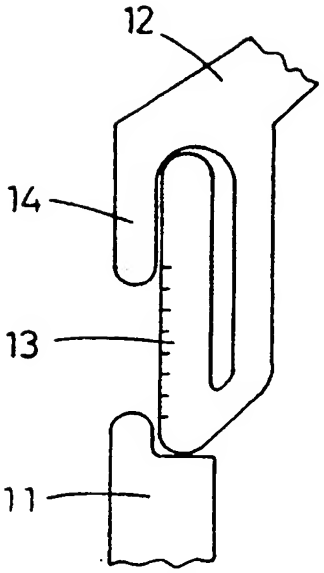

fig.4

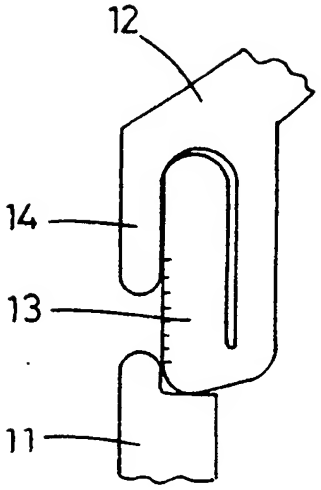

fig.5

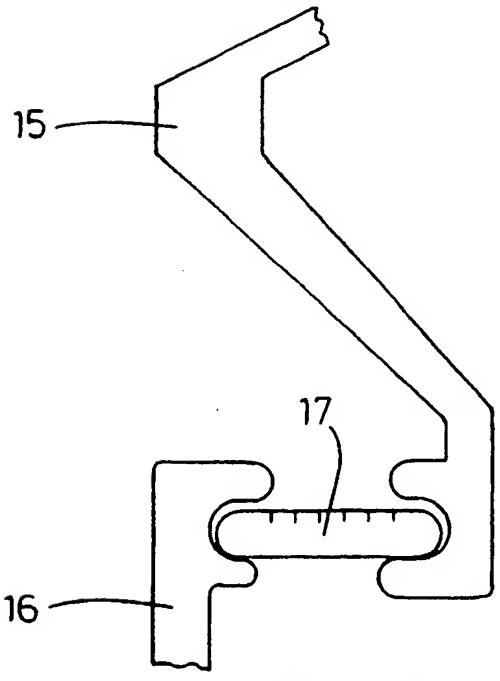

fig.6

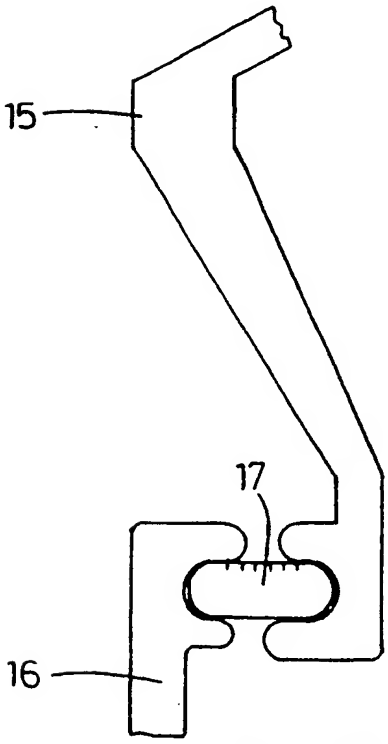

fig.7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 20 0117

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-A-2 926 728 (DRAEGERWERK AG) * page 5, lines 2-12; figures 1-3 *	1,2,4,6-9,12,18,19	B 65 D 81/20 B 65 D 79/02
A	US-A-2 126 212 (T. S. J. RICHARDS) * page 1, column 1, line 44 - column 2, line 5; page 1, column 2, lines 27-55; figure 4 *	1,12,14	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	17-08-1989	NOVELLI B.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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